

# FOODiE, Fortran Object oriented Ordinary Differential Equations integration library based on Abstract Calculus Pattern

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## Abstract

To be written.

**Keywords:** Ordinary Differential Equations (ODE), Partial Differential Equations (PDE), Object Oriented Programming (OOP), Abstract Calculus Pattern (ACP), Fortran,

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## PROGRAM SUMMARY

*Manuscript Title:* FOODiE, Fortran Object oriented Ordinary Differential Equations integration library based on Abstract Calculus Pattern

*Authors:* Zaghi, S., Curcic, M., Rouson, D., Beekman, I.

*Program title:* FOODiE

*Journal Reference:*

*Catalogue identifier:*

*Licensing provisions:* GNU General Public License (GPL) v3

*Programming language:* Fortran (standard 2008 or newer); developed and tested with GNU gfortran 5.2 or newer

*Computer(s) for which the program has been designed:* designed for shared-memory multi-cores workstations and for hybrid distributed/shared-memory supercomputers, but any computer system with a Fortran (2008+) compiler is suited

*Operating system(s) for which the program has been designed:* designed for POSIX architecture and tested on GNU/Linux one

*RAM required to execute with typical data:* bytes: [1MB, 1GB]  $\times$  core, simulation-dependent

*Has the code been vectorised or parallelized?:* the library is not aware of the parallel back-end, it providing a high-level models, but the provided tests suite shows parallel usage by means of MPI library and OpenMP paradigm

*Number of processors used:* tested up to 256

*Supplementary material:*

*Keywords:* ODE, PDE, OOP, ACP, Fortran

*CPC Library Classification:* 4.3 Differential Equations, 4.10 Interpolation, 12 Gases and Fluids

*External routines/libraries used:*

*CPC Program Library subprograms used:*

*Nature of problem:*

Numerical integration of (general) Ordinary Differential Equations system

*Solution method:*

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*Restrictions:*

*Unusual features:*

*Additional comments:*

*Running time:*

*References:*

## **1. Introduction**

*1.1. Background*

*1.2. Related Works*

*1.3. Motivations and Aims*

*1.4. General Description*

## **2. Mathematical and Numerical Models**

## **3. Application Program Interface**

## **4. Tests and Examples**

## **5. Ongoing Development Activities**

## **6. Concluding Remarks and Perspectives**

## **References**